TEST REPORT

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Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2209-0143

2. Customer

- Name (FCC) : LG Electronics USA / Name (IC) : LG ELECTRONICS INC.
- Address (FCC) : 111 Sylvan Avenue North Building Englewood Cliffs New Jersey United States 07632
  Address (IC) : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)

3. Use of Report : FCC & IC Class II Permissive Change

4. Product Name / Model Name : Telematics / TLVLM3IU-N
   FCC ID : BEJTLVLM3IU-N
   IC : 2703H-TLVLM3IUN

5. FCC Regulation(s): Part 2, 22, 24, 27
   IC Standard(s): RSS-Gen Issue 5, 132 Issue 3, 133 Issue 6, 139 Issue 3
   Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2022.06.28 ~ 2022.08.04

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : See appended test report.

9. Test Result : Refer to attached test result.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test report is not related to KOLAS accreditation.

Affirmation	Tested by Name : JaeHyeok Bang (Signature)	Technical Manager Name : JaeJin Lee (Signature)

2022 . 09 . 06 .

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2209-0143	Sep. 06, 2022	Initial issue	JaeHyeok Bang	JaeJin Lee

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1. GENERAL INFORMATION

FCC Classification	PCS Licensed Transmitter (PCB)
FCC ID	BEJTLVLM3IU-N
IC	2703H-TLVLM3IUN
Product Name	Telematics
Model Name	TLVLM3IU-N
Add Model Name	-
FVIN(Firmware Version Identification Number)	X308
EUT Serial Number	Conducted & Radiated : 205NVRG138406
Supplying power	DC 12 V
Antenna Information	Antenna Type: External Antenna (Model : 5Q0.035.507.AJ NA / PN : 35219102) Antenna gain(including connected cable loss between transmitter and antenna): Gain: -3.31 dBi (Band850), -4.75 dBi (Band1700), -4.24 dBi (Band1900)

Mode	Tx Frequency (MHz)	ERP (Max. Power)		EIRP (Max. Power)	
		dBm	W	dBm	W
GPRS850	824.2 ~ 848.8	21.83	0.152	23.98	0.250
EDGE850	824.2 ~ 848.8	17.07	0.051	19.22	0.084
GPRS1900	1 850.2 ~ 1 909.8	-	-	24.23	0.265
EDGE1900	1 850.2 ~ 1 909.8	-	-	18.70	0.074
WCDMA850	826.4 ~ 846.6	13.67	0.023	15.82	0.038
WCDMA1700	1 712.4 ~ 1 752.6	-	-	19.50	0.089
WCDMA1900	1 852.4 ~ 1 907.6	-	-	20.63	0.116

2. INTRODUCTION

2.1. EUT DESCRIPTION

The Equipment Under Test (EUT) supports 850/1900 GPRS, 850/1700/1900 WCDMA, Multi-band LTE, 802.11b/g/n WLAN(2.4GHz).

2.2. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 ℃ ~ +24 ℃
▪ Relative Humidity	41 % ~ 43 %

2.3. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.4. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	4.9 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.0 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (Above 18 GHz)	5.3 dB (The confidence level is about 95 %, k = 2)

2.5. TEST FACILITY

DT&C Co., Ltd.

The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.
The test site complies with the requirements of Part 2.948 according to ANSI C63.4-2014.

- FCC & IC MRA Designation No. : KR0034

- ISED#: 5740A

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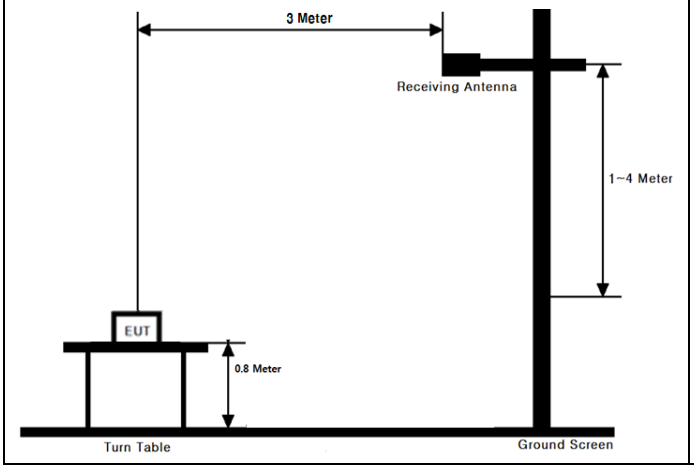
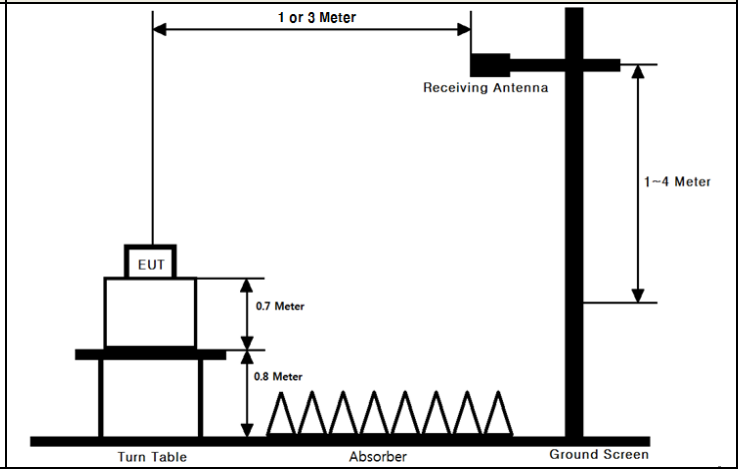
3. DESCRIPTION OF TESTS

3.1. ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.17**
- **KDB971168 D01v03 - Section 5.2.2**
- **ANSI 63.26-2015 – Section 5.2.4.4.1**

Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1 % to 5 % of the OBW.
3. Set VBW ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   1) Set = auto-couple, or
   2) Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately

determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

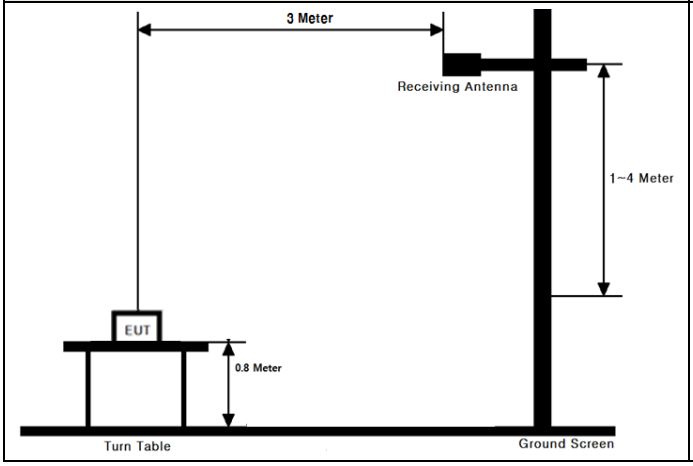
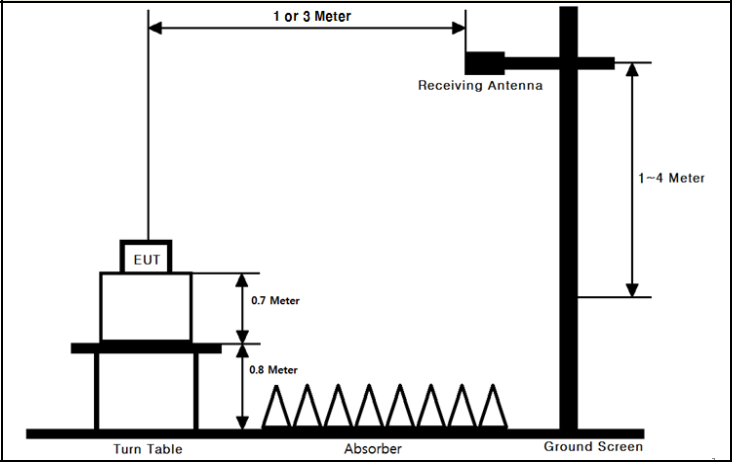
The ERP/EIRP is calculated using the following formula:

ERP/EIRP = The conducted power at the substitute antenna`s terminal [dBm] + Substitute Antenna gain [dBd for ERP, dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn antenna and an isotropic antenna are taken into consideration.

3.2. RADIATED SPURIOUS EMISSIONS

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.12**
- **KDB971168 D01v03 - Section 5.8**
- **ANSI C63.26-2015 - Section 5.5**

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 X RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.
For radiated spurious emission measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.
For radiated spurious emission measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	21/12/16	22/12/16	MY46471172
Spectrum Analyzer	Agilent Technologies	N9020A	22/04/04	23/04/04	MY50410163
DC power supply	SM techno	SDP30-5D	22/06/24	23/06/24	305DMG305
DC power supply	Agilent Technologies	66332A	22/06/24	23/06/24	US37474125
Multimeter	FLUKE	17B+	21/12/16	22/12/16	36390701WS
Radio Communication Analyzer	Agilent Technologies	E5515C	21/12/16	22/12/16	GB48360842
Thermohygrometer	BODYCOM	BJ5478	21/12/16	22/12/16	120612-2
Thermohygrometer	BODYCOM	BJ5478	21/12/16	22/12/16	120612-1
Signal Generator	Rohde Schwarz	SMBV100A	21/12/16	22/12/16	255571
Signal Generator	ANRITSU	MG3695C	21/12/16	22/12/16	173501
Loop Antenna	ETS-Lindgren	6502	21/01/28	23/01/28	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	21/12/16	22/12/16	3362
Dipole Antenna	A.H.Systems Inc.	FCC-4	20/12/16	22/12/16	710A
Dipole Antenna	Schwarzbeck	UHA9105	21/12/16	23/12/16	2262
HORN ANT	ETS	3117	21/12/16	22/12/16	00140394
HORN ANT	ETS	3117	22/06/24	23/06/24	00143278
HORN ANT	A.H.Systems	SAS-574	22/06/24	23/06/24	154
HORN ANT	A.H.Systems	SAS-574	22/06/24	23/06/24	155
Amplifier	EMPOWER	BBS3Q7ELU	22/06/24	23/06/24	1020
PreAmplifier	H.P	8447D	21/12/16	22/12/16	2944A07774
PreAmplifier	Agilent	8449B	22/06/24	23/06/24	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	22/06/24	23/06/24	7
High-pass filter	Wainwright	WHKX10-2838-3300-18000-60SS	22/06/24	23/06/24	2
Cable	JUNFLON	MWX241/B	22/01/04	23/01/04	M-3
Cable	JUNFLON	MWX221	22/01/04	23/01/04	M-4
Cable	JUNFLON	MWX221	22/01/04	23/01/04	M-5
Cable	DTNC	Cable	22/01/04	23/01/04	M-6
Cable	JUNFLON	J12J101757-00	22/01/04	23/01/04	M-7
Cable	HUBER+SUHNER	SUCOFLEX104	22/01/04	23/01/04	M-8
Cable	Junkosha	MWX342	22/01/04	23/01/04	RFC-72

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.
Note2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	RSS Section(s)	Parameter	Status Note 1
22.913(a) 24.232(c) 27.50(d.4)	RSS-132 [5.4] RSS-133 [6.4] RSS-139 [6.5]	Effective Radiated Power Equivalent Isotropic Radiated Power	C Note2
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132 [5.5] RSS-133 [6.5] RSS-139 [6.6]	Radiated Spurious and Harmonic Emissions	C Note2

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: This test item was performed in three orthogonal EUT positions and the worst case data was reported.

6. EMISSION DESIGNATOR AND SAMPLE CALCULATION

A. For substitution method

1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1 GHz respectively above ground.
2) The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3) During the test, the turn table is rotated until the maximum signal is found.
4) Record the field strength meter's level. (ex. Spectrum reading level is -8.5 dBm)
5) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
6) Increase the signal generator output till the field strength meter's level is equal to the item (4). (ex. Signal generator level is -18.04 dBm)
7) The gain of the cable and amplifier between the signal generator and terminals of substituted antenna is 46.92 dB at test frequency.
8) Record the level at substituted antenna terminal. (ex. 28.88dBm)
9) The result is calculated as below;

EIRP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBi)
ERP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBd)
Where, TX Antenna Gain (dBd) = TX Antenna Gain (dBi) - 2.15 dB

7 TEST DATA

7.1 EFFECTIVE RADIATED POWER

- Test Notes

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band.

The worst case data is reported.

- GPRS850 data

Mode	CH	Frequency (MHz)	Ant. Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Note.
GPRS850	128	824.2	H	22.01	-0.76	21.25	0.133	-
GPRS850	**190**	**836.6**	**H**	**22.68**	**-0.85**	**21.83**	**0.152**	**-**
GPRS850	251	848.8	H	22.12	-0.95	21.17	0.131	-
EDGE850	**190**	**836.6**	**H**	**17.92**	**-0.85**	**17.07**	**0.051**	**-**

- WCDMA850 data

Mode	CH	Frequency (MHz)	Ant. Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Note.
WCDMA850	4 132	826.4	H	13.79	-0.77	13.02	0.020	-
WCDMA850	4 183	836.6	H	13.64	-0.85	12.79	0.019	-
WCDMA850	**4 233**	**846.6**	**H**	**14.60**	**-0.93**	**13.67**	**0.023**	**-**

7.2. EQUIVALENT ISOTROPIC RADIATED POWER

- Test Notes

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band.

The worst case data is reported.

- GPRS1900 data

Mode	CH	Frequency (MHz)	Ant. Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Note.
GPRS1900	512	1 850.2	V	19.23	4.76	23.99	0.251	-
GPRS1900	661	1 880.0	V	18.83	4.56	23.39	0.218	-
GPRS1900	**810**	**1 909.8**	**V**	**19.78**	**4.45**	**24.23**	**0.265**	**-**
EDGE1900	**810**	**1 909.8**	**V**	**14.25**	**4.45**	**18.70**	**0.074**	**-**

- WCDMA1700 data

Mode	CH	Frequency (MHz)	Ant. Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Note.
WCDMA1700	1 312	1 712.4	V	12.30	5.91	18.21	0.066	-
WCDMA1700	**1 412**	**1 732.4**	**V**	**13.81**	**5.69**	**19.50**	**0.089**	**-**
WCDMA1700	1 513	1 752.6	V	12.51	5.47	17.98	0.063	-

- WCDMA1900 data

Mode	CH	Frequency (MHz)	Ant. Pol. (H/V)	LEVEL@ TX ANTENNA TERMINAL (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (W)	Note.
WCDMA1900	**9 262**	**1 852.4**	**V**	**15.89**	**4.74**	**20.63**	**0.116**	**-**
WCDMA1900	9 400	1 880.0	V	15.13	4.56	19.69	0.093	-
WCDMA1900	9 538	1 907.6	V	13.91	4.44	18.35	0.068	-

7.3. RADIATED SPURIOUS EMISSIONS

- Test Notes

1. This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band.
   The worst case data is reported.
2. Limit Calculation = 43 + 10 $\log_{10}$(P[Watts])
3. No other spurious and harmonic emissions were reported greater than listed emissions.

- GPRS850 data

Channel	Tx Freq. (MHz)	Freq. (MHz)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Limit (dBm)	Margin (dB)	Note.
128	824.2	1 648.56	V	-28.15	4.04	-24.11	-13.00	11.11	-
		2 472.93	V	-45.83	3.69	-42.14	-13.00	29.14	-
		4 121.30	V	-52.21	6.99	-45.22	-13.00	32.22	
		4 945.40	H	-51.71	7.64	-44.07	-13.00	31.07	-
190	836.6	1 673.17	V	-29.17	3.98	-25.19	-13.00	12.19	-
		2 510.00	V	-45.31	3.58	-41.73	-13.00	28.73	-
		4 182.58	V	-49.59	7.10	-42.49	-13.00	29.49	
		5 019.29	H	-51.81	7.72	-44.09	-13.00	31.09	-
251	848.8	1 697.73	V	-28.31	3.91	-24.40	-13.00	11.40	-
		2 546.20	V	-42.58	3.86	-38.72	-13.00	25.72	-
		4 243.90	V	-48.46	7.17	-41.29	-13.00	28.29	
		5 093.30	H	-53.74	7.71	-46.03	-13.00	33.03	-

- WCDMA850 data

Channel	Tx Freq. (MHz)	Freq. (MHz)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBd)	Correct Generator Level (dBm)	Limit (dBm)	Margin (dB)	Note
4 132	826.4	1 654.60	H	-57.83	4.03	-53.80	-13.00	40.80	-
		2 474.33	H	-54.62	3.68	-50.94	-13.00	37.94	-
4 183	836.6	1 671.44	H	-56.90	3.98	-52.92	-13.00	39.92	-
		2 508.92	H	-53.97	3.57	-50.40	-13.00	37.40	-
4 233	846.6	1 694.42	H	-56.79	3.92	-52.87	-13.00	39.87	-
		2 544.51	H	-54.40	3.85	-50.55	-13.00	37.55	-

- GPRS1900 data

Channel	Tx Freq. (MHz)	Freq. (MHz)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Limit (dBm)	Margin (dB)	Note
512	1 850.2	3 700.12	V	-52.79	8.21	-44.58	-13.00	31.58	-
		5 550.45	V	-43.46	10.18	-33.28	-13.00	20.28	-
661	1 880.0	3 760.14	V	-52.81	8.27	-44.54	-13.00	31.54	-
		5 639.74	V	-52.66	10.25	-42.41	-13.00	29.41	-
810	1 909.8	3 819.62	V	-50.62	8.42	-42.20	-13.00	29.20	-
		5 729.34	V	-56.46	10.33	-46.13	-13.00	33.13	-

- WCDMA1700 data

Channel	Tx Freq. (MHz)	Freq. (MHz)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Limit (dBm)	Margin (dB)	Note
1 312	1 712.4	3 423.90	V	-56.25	8.00	-48.25	-13.00	35.25	-
1 412	1 732.4	3 461.41	V	-55.74	8.11	-47.63	-13.00	34.63	-
1 513	1 752.6	3 496.07	V	-56.47	8.21	-48.26	-13.00	35.26	-

- WCDMA1900 data

Channel	Tx Freq. (MHz)	Freq. (MHz)	POL (H/V)	LEVEL@ ANTENNA TERMINAL (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Limit (dBm)	Margin (dB)	Note
9 262	1 852.4	3 702.33	V	-56.64	8.21	-48.43	-13.00	35.43	-
		5 563.02	H	-56.31	10.18	-46.13	-13.00	33.13	-
9 400	1 880.0	3 762.19	V	-55.90	8.27	-47.63	-13.00	34.63	-
		5 630.24	H	-56.57	10.23	-46.34	-13.00	33.34	-
9 538	1 907.6	3 807.69	V	-55.91	8.39	-47.52	-13.00	34.52	-
		5 732.38	H	-57.36	10.33	-47.03	-13.00	34.03	-